



Environmental
Science &
Engineering, Inc.

June 29, 1993

Mr. Scott O. Seery, CHMM
Alameda County Health Care Services Agency
Division of Hazardous Materials
80 Swan Way, Room 350
Oakland, California 94621

**SUBJECT: WORKPLAN FOR SOIL AND GROUND-WATER INVESTIGATION
ENGINEER'S HILL
SANTA RITA CORRECTIONAL FACILITY
DUBLIN, CALIFORNIA
ESE PROJECT NO. 6-93-5073**

Dear Mr. Seery:

Environmental Science & Engineering, Inc. (ESE) has been selected by the Alameda County General Services Agency (GSA) to conduct subsurface soil and ground-water investigation at the subject site (Figure 1). Toward accomplishing this task, ESE is submitting this workplan for your approval. The objectives of our scope of work are to (1) determine the vertical and lateral extent of petroleum hydrocarbons in soil beneath the site, (2) measure the depth to ground water and determine if petroleum hydrocarbons have migrated through the vadose zone to ground water beneath the site, and (3) identify sediment stratigraphy and potential product migration routes. Site history and the proposed scope of work are described in the following sections.

SITE HISTORY

The subject site is owned and managed by the GSA. At the site, the GSA formerly operated one 1,000-gallon-capacity underground storage tank (UST) containing diesel fuel, identified as UST 2942-23, at Engineer's Hill (Figure 2). The UST was constructed of single-walled carbon-steel and fueled a boiler formerly located in a building adjacent to the UST location. The installation date of the UST is unknown.

Under permit from the Alameda County Health Care Services Agency (HCSA) and the Doherty Regional Fire Authority (DRFA), ESE removed and disposed of the UST on May 18, 1992. Personnel from the HCSA and DRFA witnessed the UST removal activities and subsequent soil sampling. No fluids were found in the UST prior to removal.

Mr. S. O. Seery / HCSA
June 29, 1993
page 2

ESE personnel collected one soil sample from the base of the excavation (identified as 23W on Figure 2). The sample was submitted to a state-certified laboratory where it was analyzed for total petroleum hydrocarbons quantified as diesel fuel (TPH-D), benzene, toluene, ethylbenzene, and total xylenes (BTEX), and oil and grease (O&G). The sample was found to contain 190 milligrams per kilogram (mg/kg) TPH-D. Neither BTEX nor O&G were detected (ESE, 1992). ESE submitted a UST closure report to the HCSA on June 25, 1992.

ESE supervised overexcavation of the former UST location on November 8, 1992. At 9 feet below ground surface (bgs), ESE personnel observed grey discoloration in a pebbly sand sediment and noted a diesel fuel odor. The impacted soil was observed to extend to the limit of equipment's reach at 22 feet bgs. One sample (T23-1-SP), collected by ESE from the impacted soil at 22 feet bgs (Figure 2), was submitted to a state-certified laboratory and found to contain TPH-D (1,400 mg/kg) and BTEX constituents (ESE, 1993).

To determine the areal extent of impacted soil, three test pits were excavated to maximum depths of 22 feet bgs at locations approximately 10 to 25 feet east, west, and south of the former UST location (Figure 2). No soil discoloration or petroleum hydrocarbon odors were noted at these locations. Ground water was not found in these excavations, and it remains unknown if ground water has been impacted by diesel fuel (ESE, 1993). Results of the excavation activities were documented in a report to the GSA dated January 7, 1993.

SCOPE OF WORK

To accomplish the objectives outlined in the introduction of this workplan, ESE proposes to conduct the following work at the site:

TASK 1 – DRILLING AND GROUND-WATER SAMPLING

To determine the vertical and lateral extent of the petroleum hydrocarbon plume in soil at the site, ESE proposes to drill four soil borings (EH-1, EH-2, EH-3, and EH-4) proximal to the former UST location. The proposed borings will be permitted with the Zone 7 Water Agency and, upon completion of the proposed field work, a copy of each boring log will be forwarded to that agency. The borings will be drilled by a state-licensed water-well driller using a truck-mounted hollow-stem-auger drill rig.

All workers will attend a safety meeting at the site immediately prior to beginning the field work and will be required to sign the Site Health and Safety Plan (HASP), acknowledging that they understand the safety goals and procedures for these activities. Prior to

Mr. S. O. Seery / HCSA
June 29, 1993
page 3

entering the exclusion zone, any visitors will be required to review and sign the HASP and provide proof of OSHA 40-hour training certification. A copy of the HASP for this site is included as Attachment 1.

Boring EH-1 will be drilled to ground water at the east end of the UST excavation, adjacent to an area where impacted soil was observed (Figure 2). Soil samples from this boring will indicate if the petroleum hydrocarbon plume extends downward through the vadose zone to the upper aquifer. Based on the findings from Boring EH-1, ESE will drill the remaining three borings at locations north, south, and west of the former UST location. The exact boring locations will depend upon the extent of contaminant migration estimated from data collected during the investigation.

Boring EH-1 will be continuously sampled to accurately identify and document sediment stratigraphy beneath the site. In Borings EH-2, EH-3 and EH-4, ESE personnel will collect soil samples at 5-foot depth intervals, at distinct stratigraphic contacts, and immediately above the first occurrence of ground water. The depth to ground water has been estimated at approximately 70 feet bgs and the ground-water flow direction is presumed to follow topography toward the south.

An ESE geologist will direct the field activities and log and collect all soil samples. The samples will be collected in accordance with ESE Standard Operating Procedure No. 1 (Attachment 2). The methods described in ESE Standard Operating Procedure No. 1 meet HCSA guidelines and follow California Regional Water Quality Control Board Tri-Regional Board recommendations.

Presuming ground water occurs at 70 feet bgs, ESE estimates that a total of 14 soil samples will be collected from each boring. The 14 samples collected from Boring EH-1 at 5-foot intervals and the estimated 42 samples from Borings EH-2, EH-3 and EH-4 will be analyzed for TPH-D using U.S. Environmental Protection Agency (EPA) Method 8015 (modified per CA Luft). Of these samples, five samples will also be analyzed for BTEX using EPA Method 8020. ~~Sample selection will be based on field evidence such as visual staining and odor.~~ The analyses will be performed by a state-certified laboratory on a normal turnaround time basis.

To determine if ground water has been impacted beneath the former UST location, ESE proposes to collect one ground-water sample from Boring EH-1 using a Hydropunch ground-water sampling tool. The ground-water sample will be collected and decanted into appropriate laboratory-supplied glassware, labeled, and stored in a cooler with ice for transport to the laboratory under proper chain-of-custody documentation. The ground-water sample will be analyzed, on a normal turnaround time basis, for TPH-D using EPA Method 8015 (modified per CA Luft) and BTEX using EPA Method 8020.

Mr. S. O. Seery / HCSA
June 29, 1993
page 4

Pending analytical results, all soil and ground water generated during the investigation will be stored on site. The soil will be stockpiled on, and covered with plastic sheeting. The rinse water will be stored in U.S. Department of Transportation (DOT)-rated 55-gallon-capacity steel drums. Upon receipt of an analytical results, the GSA will select an appropriate method of soil and rinse-water recycling or disposal.

TASK 2 – REPORT PREPARATION

ESE will evaluate all observational and analytical data, and prepare a report of our findings for submittal to the HCSA. The report will include current analytical data, iso-concentration maps of the compounds detected in soil, discussion of the findings with a volume estimate of impacted soil, ESE's conclusions, and recommendations for future work, if appropriate. Geologic logs for the four borings will be included as an appendix.

REFERENCES

- Environmental Science & Engineering, Inc., 1992, Letter Report for Closure of UST 2942-23 Located at Engineer's Hill, Santa Rita Correctional Facility, Dublin, California: Unpublished report prepared for the Alameda County Health Care Services Agency, dated June 25, 1992.
- Environmental Science & Engineering, Inc., 1993, Letter Report of Overexcavation Activities at Engineer's Hill, Santa Rita Correctional Facility, Dublin, California: Unpublished report prepared for the Alameda County General Services Agency, dated January 7, 1993.

Mr. S. O. Seery / HCSA
June 29, 1993
page 5

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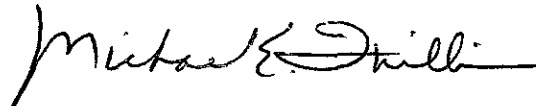
The GSA has expressed a desire to complete the proposed scope of work as soon as possible. Therefore, ESE will proceed with permitting and scheduling activities immediately upon receipt of HCSA approval of this workplan. We expect to begin the field work within approximately 2 weeks of HCSA approval. The GSA or ESE will notify you of any scheduled field work at the site at least 48 hours in advance.

Thank you for your attention to this matter. If you have any questions regarding this workplan, please call the undersigned at (510) 685-4053.

Sincerely,
ENVIRONMENTAL SCIENCE & ENGINEERING, INC.



Bart S. Miller
Senior Staff Geologist

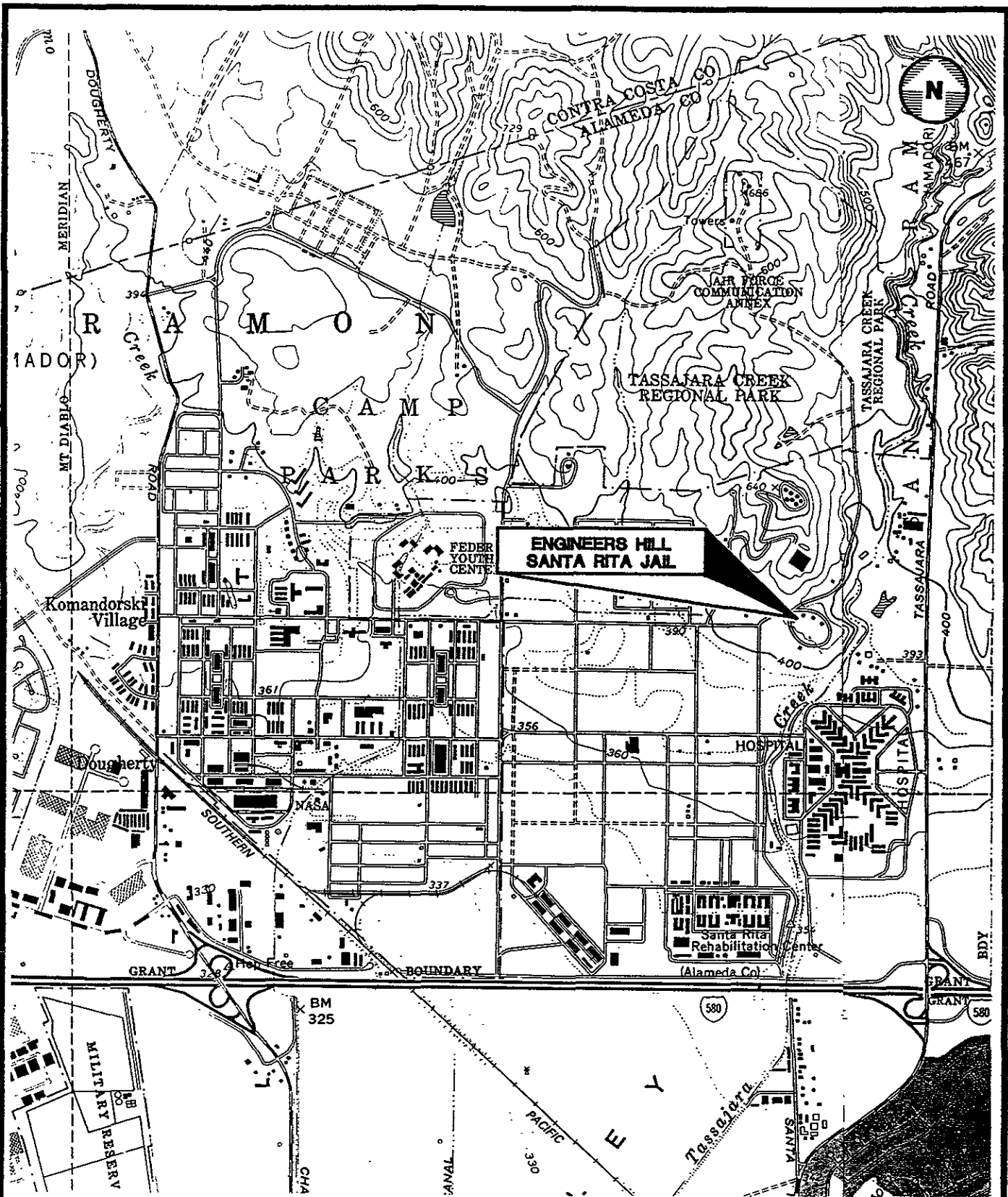


Michael E. Quillin, R.G.
Senior Geologist
California Registered Geologist No. 5315

Attachments

pc: Jim de Vos, GSA
Peter Kinney, GSA
Pat Galvin, ESE

FIGURES



Adapted From USGS 7.5 Minute Dublin and Livermore Topographic Quadrangles (1980)



Environmental
Science &
Engineering, Inc.

DATE
6/93

PROJ. NO.
6-93-5073

ALAMEDA COUNTY GENERAL SERVICE AGENCY
SANTA RITA CORRECTIONAL FACILITY
DUBLIN, CALIFORNIA

DRAWN BY
CVS

CAD FILE
50731001

4090 NELSON AVENUE, SUITE J
CONCORD, CA 94520

APPROVED BY

REVISED

FIGURE 1
LOCATION MAP



ASPHALT ROAD

BUILDING NO. 123

TOPOGRAPHIC GRADIENT

BUILDING NO. 456

FORMER DIESEL FUEL UNDERGROUND STORAGE TANK EXCAVATION LIMITS (10-Foot Depth)

TEST PIT 1 (22 Foot Depth)

TEST PIT 4 (22-Foot Depth)

23W

TEST PIT 2 (22-Foot Depth)

BOILER SHACK

T23-1-SP

TEST PIT 3 (22-Foot Depth)



LEGEND

T23-1-SP X SOIL SAMPLE LOCATION WITH SAMPLE NUMBER

□ TEST PIT EXCAVATION

⊗ PROPOSED BORING LOCATION (EH-1)

SCALE
0 20 FEET

 Environmental Science & Engineering, Inc. <small>A GILCORP Company</small>	DATE 7/93	PROJ. NO. 6-93-5073	ALAMEDA COUNTY GENERAL SERVICES AGENCY SANTA RITA CORRECTIONAL FACILITY DUBLIN, CALIFORNIA
	DRAWN BY CVS	CAD FILE 50732002	
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	APPROVED BY	REVISED	 SITE

ATTACHMENT 1
SITE HEALTH AND SAFETY PLAN

HEALTH & SAFETY PLAN

For Work to be Performed at

**Engineer's Hill, Santa Rita Correctional Facility
Dublin, California**

**HEALTH AND SAFETY PLAN
for
PETROLEUM AND SOLVENT CONTAMINATION SITES**

TABLE OF CONTENTS

	<u>Page</u>
1.0 General Information	1
1.1 Introduction	1
1.2 Site Information	1
1.3 Regulatory Requirements	1
2.0 Personnel Requirements	2
2.1 Organization	2
2.2 ESE Health and Safety Policy and Responsibility	2
2.3 Personnel Responsibilities	2
2.4 Training	4
2.5 Medical Monitoring Program	4
2.6 Records Documentation	5
3.0 Hazard Evaluation	6
3.1 Chemical Contaminants	6
3.2 Physical and Mechanical Hazards	6
3.3 Job Hazard Analysis and Risk Assessment	6
3.4 Air Monitoring	6
4.0 Personal Protective Equipment	8
5.0 Standard Work Practices	11
5.1 General Safety Rules	11
5.2 Work Limitations	12
5.3 Accident Prevention Plan/Accident Reporting	13
5.4 Work Zones and Decontamination Procedures	14
5.5 Site Security and Entry	14
6.0 Emergency Information and Contingency Plans	15
6.1 Injury Contingency Plan	15
6.2 Fire Control and Contingency Plan	15
6.3 Spill Control and Contingency Plan	16
6.4 Off Site Incident Contingency Plan	16
6.5 Community Threat Contingency Plan	16

APPENDICES

- A. SITE SPECIFIC HEALTH AND SAFETY INFORMATION
- B. CERTIFICATES OF INSURANCE (Optional)
- C. MATERIAL SAFETY DATA SHEETS (Optional)

TABLES

2-1 Medical Examination--Monitoring Program	4
5-1 Windchill Index	13

**HEALTH AND SAFETY PLAN
for
PETROLEUM AND SOLVENT CONTAMINATION SITES**

CLIENT: ALAMEDA COUNTY GENERAL SERVICES AGENCY

1.0 GENERAL INFORMATION

1.1 INTRODUCTION:

This Health and Safety Plan shall provide the safety and health requirements for site work taking place under a contract with Alameda County GSA. This Plan provides the structure for a Site-Specific Health and Safety Plan, and provides information which will apply to all sites in this project. Together, they comprise the Site Safety and Health Plan (HASP). This Health & Safety Plan will be considered complete only with an associated Site-Specific Health and Safety Information for each site.

The purpose of this safety plan is to protect individuals, those working at the site, visitors, and the surrounding populace, and the environment during on site sampling and site characterization activities at petroleum contamination sites. This plan includes preventive and protective measures against health hazards, fire and explosion hazards, and mechanical hazards which may exist or occur during field activities.

1.2 SITE INFORMATION:

The General Information section of each Site-Specific Health and Safety Plan will provide the following information:

1. Name and Location of the Site;
2. Name of Individual Preparing the Plan, and Date of Preparation;
3. Brief Site History;
4. Investigative Objective and Work Plan;
5. Proposed Dates of Investigation, and;
6. Assessment of Overall Worker and Public Health Hazards.

1.3 REGULATORY REQUIREMENTS:

Occupational Safety and Health Administration (OSHA) standards 29 Code of Federal Regulations (CFR) 1910 and 1926 apply to work under this site-specific HASP. Title 8 of California Code of Regulations (General Construction Safety orders and General Safety Orders) must be complied with at California sites.

Additional requirements are contained in Code of Federal Regulations title 40, Protection of the Environment.

2.0 PERSONNEL REQUIREMENTS

2.1 Organization

The overall project organization as described in this document will be shown in the Site-Specific Health and Safety Plan, and will identify and show responsibilities for all key personnel, employees, and subcontractors.

2.2 Environmental Science & Engineering Health and Safety Policy and Responsibility

It is the policy of the management of Environmental Science & Engineering, Inc. (ESE) and also a contract requirement that a safety plan be implemented at hazardous material contamination sites to protect individuals and the environment. All ESE personnel involved in work on these sites will conform and comply with all aspects of this safety program. Each and every individual is, and therefore must regard and conduct him/herself as, a member of the safety team and adhere to the prescribed site safety plan to ensure his/her own safety as well as that of fellow workers, visitors, and the public.

A key element of this plan is the reliance upon the buddy system for all site activities at all times. This system requires that all activities at the site be conducted using a minimum of 2-person teams.

2.3 Personnel Responsibilities

For each site, the responsibilities of the Project Manager include:

1. Preparing an effective site safety plan for the project;
2. Categorizing and identifying for the project staff the levels of potential exposure and dangerous levels of hazardous materials possibly encountered on site;
3. Ensuring that adequate and appropriate safety training and equipment are available for project personnel; and
4. Arranging for medical examinations for specified project personnel.
5. Ensuring a qualified on-site field person is designated Site Safety Officer (SSO) and is present when work is in progress. Alternates may also be designated as needed, however, the project manager must ensure the designated (SSO) is familiar with the safety plan and his/her responsibilities.
6. Ensuring any subcontractors (i.e. drillers, excavators) get an advance copy of the Health and Safety Plan and a start-up safety briefing is scheduled.
7. Determining appropriate level of protection and exposure monitoring strategy for the project by task or phase.

Overall responsibility for safety during the site investigative activities rests with the Project Manager. To assist the Project Manager, a qualified Site Safety Officer will be appointed for each site.

The Site Safety Officer's responsibilities include:

1. Implementing all safety procedures and operations on site.
2. Conducting start-up safety briefing with project personnel and subcontractors. Ensure all necessary equipment and procedures are in place before start-up. Addressing any substandard conditions requiring correction prior to start up.
3. Updating equipment or procedures based upon new information gathered during the site inspection.
4. Upgrading or downgrading the levels of personal protection based upon site observations and/or measurements.
5. Determining and posting locations and routes to medical facilities and arranging emergency transportation to medical facilities (as required).
6. Controlling site entry and notifying (as required) local public emergency officers (i.e., police and fire departments) of the nature of the team's operations and making emergency telephone numbers available to all team members.
7. Ensuring that at least one member of the field team is available to stay behind and notify emergency services if the Site Safety Officer must enter an area of maximum hazard or entering this area only after notifying emergency services (police department).
8. Observing work party members for symptoms of on-site exposure or stress.
9. Arranging for the availability of on-site emergency medical care and first aid, as necessary.
10. Documenting field activities and incidents. Keeping Project Manager informed. Consulting with Health and Safety Officer as needed.

The Health and Safety Officer (HSO) is responsible for:

1. Assisting Project Manager with development of the site specific Health and Safety Plan.
2. Providing technical support during normal operations and upsets for hazard assessment, exposure monitoring, level of protection changes.
3. Reviewing and approving the site specific safety plan.

The responsibilities of all other on site personnel include:

1. Complying with all aspects of the project Safety plan, including strict adherence to the buddy system.
2. Obeying the orders of the Site Safety Officer.
3. Notifying the Site Safety Officer of hazardous or potentially hazardous incidents or working situations.

Subcontractors and other non-ESE site personnel are also responsible for complying with this plan and all applicable federal, state and local safety and environmental regulations and codes.

2.4 Training

All ESE site personnel working on the hazardous material contamination site investigations will have completed a safety and health training course for hazardous waste site work meeting the requirements of 29CFR1910.120 and have worked at least 3 days of supervised on the job training. The course consists of an initial 40-hour session and annual refreshers of 8 hours. Subcontractors and visitors are required to provide proof of equivalent training. The field team leader will have completed an additional 8 hours of waste site supervisory training. For each location, specific training is given by the Project Manager or Site Safety Officer to inform employees of site-specific hazards.

At least one field team member will be trained to perform cardiopulmonary resuscitation (CPR) and first aid.

2.5 Medical Monitoring Plan

All ESE on site personnel, subcontractors, and visitors for this project will be required to have the medical examination outlined in Table 1. This examination is given annually and more often if specified by the attending physician. All medical examinations include certification by the physician of the employee's ability to wear a negative-pressure respirator and to perform strenuous work. If a person sustains an injury or contracts an illness related to work on site that results in lost work time, he must obtain written approval from a physician to regain access to the site.

Table 2.1

Medical Examination--Monitoring Program

Basic physical exam

Heart status and functions (EKG) baseline only except if >40

Chest X-ray (Roentgenogram posterior-anterior)

Pulmonary function--forced vital capacity, forced expiratory volume at 1 second and reserve volume

Blood--full SMAC Series

Hemoglobin--cell counts, protein levels

Liver function--full enzyme profile

Renal function--BUN, Creatinine, Creatine/Creatinine ratio, lipoprotein count and differential, uric acid

Urinalysis

Audiometry--audio spectrum response of ear

Eye--physical condition, visual acuity

Other laboratory tests may be ordered depending on actual or expected exposures and physician recommendations.

The individuals listed in the Site-Specific Plan organization chart will be certified to wear respirator protection in accordance with criteria from the ANSI Z88.2 and 29 CFR 1910.134.

2.6 Records Documentation

Air monitoring data generated during the project will become part of the written record. Both medical and air monitoring data will be retained for the time period required by OSHA in various standards [29 CFR 1910.20(D)(i), 1910.20(D)(ii), 1910.1018, 1910.1025]. Training records are maintained in project files and on ESE's personal identification cards and are available for inspection at all times. Subcontractors are required to have similar documents available for inspection as required.

All personnel associated with work at a site will be required to sign a statement indicating that they have read, and will comply with the site safety plan. This signature page will also include information on their training and medical surveillance status.

3.0 HAZARD EVALUATION

3.1 Chemical Contaminants

Potential site contaminants at petroleum contamination sites include gasoline, gasohol, motor oil, fuel oils (including kerosene, diesel fuel), and aviation grade gasoline. These materials may exist as free product in soil or on groundwater, and/or as contaminants to soil and water, and/or in tanks, piping, and systems. Fuel products include materials in and around storage tanks, such as gasoline, kerosene, diesel, and their derivatives, xylene, toluene, benzene, tetraethyl lead (TEL), and chlorinated solvents. The chlorinated solvents include trichloroethylene and tetrachloroethylene.

3.2 Physical and Mechanical Hazards

Activities on site may include site visits, soil gas sampling, headspace sampling, installation and sampling from monitor wells, installation of free product recovery systems, installation of groundwater recovery systems, installation of soil venting systems, installation of biological treatment systems, installation of air strippers, installation of carbon absorption units, removal of tanks, piping, and systems, and removal of contaminated soil.

Hazards associated with these activities are varied and include vehicle/pedestrian collisions, fire, collapse of excavation and trenching, handling of heavy materials and equipment operations resulting in contact and crushing type injuries, and use of air- and electrically-powered tools which may result in abrasions, contusions, lacerations, etc.

3.3 Job Hazard Analysis and Risk Assessment

The chemical contaminants which may be present and the hazardous activities which may be performed at the site will be identified through preliminary site assessment activities, such as site visits or records search. Based on this preliminary information, initial risk assessments will be made by the Site Safety Officer, in consultation with an ESE Regional Health and Safety Officer, defining hazards (both chemical and physical) to workers and other on site personnel, the surrounding populace, and the environment.

The identities of potential hazards and resultant initial risk assessments will be included in the Hazard Evaluation section of the Site-Specific Plan, will be reviewed daily, and will be updated as necessary by the Site Safety Officer. Updated information will be communicated to all other on site personnel immediately.

3.4 Air Monitoring

An air monitoring program is fundamental to the safety of on site and off site personnel. Total organic vapor (TOV) levels associated with on site activities will be monitored with a Photoionization Detection (PID) instrument (Photovac® TIP or HNU PI-101). This instrument will be the primary source of information for upgrading personal protection. Calibration and maintenance of monitoring equipment will be in accordance with manufacturer recommendations.

The Site Safety Officer, or designee, will establish daily a background TOV prior to initiating on site activities. Under most circumstances, this level can be determined by taking multiple readings at representative locations along the perimeter of the site and averaging the results of sustained measurements. (A sustained measurement is defined as the arithmetic average of six readings taken at 10-second intervals.) If, due to site conditions, it appears that perimeter readings will not yield a truly representative background level, the Site Safety Officer or an ESE Regional Health and Safety Officer will be consulted for guidance.

Decisions to upgrade personal protection will be based on sustained breathing zone TOV that exceeds background levels. Breathing zone refers to the area from the top of the shoulders to the top of the head.

Explosivity levels associated with on site activities will be monitored with an explosimeter or combustible gas meter. This will be the primary source of information for determining the potential hazard due to explosion or fire in confined spaces and other enclosed areas with little or no ventilation.

Prior to entry of any area which may contain an explosive or flammable atmosphere, the Site Safety Officer or designee will take representative readings of the suspect area. Representative readings include readings from top, middle, and lower levels of the area, and at various points at each level in larger areas. Areas in which any one reading exceeds 20% of the lower flammable limit will be considered potentially explosive, and will be vented to below 20% of the lower flammable limit before the introduction of any personnel or non-explosion proof powered equipment.

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment to be used at petroleum contamination sites will consist of several components. These components will protect the respiratory system, eyes and face, hands, feet, body, and head from a variety of chemical and physical hazards. Levels of personal protection will be categorized in accordance with the criteria described in accordance with the guidelines given in Section 3, Air Monitoring. Additional guidance for personal protective equipment can be found in the ESE Corporate Respiratory Protection Program, or can be obtained from an ESE Regional Health and Safety Officer.

Action levels for upgrading to the various protective levels and levels of personal protection required for the various tasks to be performed on each site, as well as any special site requirements, will be given in the Personal Protective Equipment section of the Site-Specific Plan.

PERSONAL PROTECTIVE EQUIPMENT--LEVEL A

1. Open-circuit, pressure-demand, self-contained breathing apparatus (SCBA);
2. Totally encapsulated suit;
3. Gloves, inner (surgical type);
4. Gloves, outer, chemical protective;
5. Boots, chemical protective, steel toe and shank; and
6. Booties, chemical protective.

CRITERIA

1. Sites known to contain hazards which:
 - a. Require the highest level of respiratory protection (as previously stated),
 - b. Will cause illness as a result of personal exposure,
 - c. Permit a reasonable determination that personal exposure could occur to any part of the body; or
2. Sites for which the Project Manager and/or Site Safety Officer make a reasonable determination that, based on the lack of information to the contrary, the site may be described as previously stated.

PERSONAL PROTECTIVE EQUIPMENT--LEVEL B

1. Open-circuit, pressure-demand SCBA;
2. Chemical protective
 - a. Overalls and long-sleeved jacket, or
 - b. Coveralls;
3. Gloves, inner (surgical type);
4. Gloves, outer, chemical protective;
5. Boots, chemical protective, steel toe and shank; and
6. Booties, chemical protective.

CRITERIA

1. Sites known to contain hazards which:
 - a. Require the highest level of respiratory protection (as previously stated),
 - b. Will cause illness as a result of personal exposure,
 - c. Permit a reasonable determination that personal exposure to areas of the body not covered by Level B protective clothing is unlikely; and
2. Sites for which the Project Manager and/or Site Safety Officer make a reasonable determination that, based on the lack of information to the contrary, the site may be described as previously stated.

PERSONAL PROTECTIVE EQUIPMENT--LEVEL C

1. Full face-piece, air-purifying respirator (high-efficiency particulate/organic vapor cartridges);
2. Emergency escape oxygen pack (carried);
3. Chemical protective (Tyvek® is the minimum protection)
 - a. Overalls and long-sleeved jacket, or
 - b. Coveralls, or
 - c. Apron;
4. Gloves, inner (surgical type) (Latex);
5. Gloves, outer, chemical protective (Nitrile);
6. Boots, chemical protective (neoprene or NBR), steel toe and shank; and
7. Booties, chemical protective (Latex).

CRITERIA

1. Sites known to contain hazards which:
 - a. Do not require a level of respiratory protection greater than the level afforded by air-purifying respirators (nominal protection of 10), as previously stated;
 - b. Will cause illness as a result of personal exposure; or
 - c. Permit a reasonable determination that personal exposure to areas of the body not covered by Level C protective clothing is unlikely; and
2. Sites for which the Project Manager and/or Site Safety Officer make a reasonable determination that, based on the lack of information to the contrary, the site may be described as previously stated.

PERSONAL PROTECTIVE EQUIPMENT--LEVEL D

1. Coveralls, cotton;
2. Boots/shoes, safety;
3. Safety glasses;
4. Hard hat with optional face shield (where overhead hazards exist); and
5. Air-purifying respirator (readily available).

CRITERIA

Sites where the Project Manager and/or Site Safety Officer make a reasonable determination that hazards due to exposure to hazardous materials are unlikely.

ADDITIONAL PERSONAL PROTECTION

In addition to personal protective equipment, field personnel having duties on or near the hazard site should have ready access to:

1. A fully stocked industrial-size first-aid kit;
2. An eyewash kit; and
3. At least 6 gallons of potable water in a pressurized container to permit decontamination in event of accidental skin or eye contact with chemicals.

5.0 STANDARD WORK PRACTICES

5.1 General Safety Rules

In addition to the specific requirements of the Site-Specific Plan, common sense should prevail at all times. The following general safety rules and practices will be in effect at the site.

1. The site will be suitably marked or barricaded as necessary to prevent unauthorized visitors, but will not hinder emergency services if needed.
2. All open holes, trenches, and obstacles will be properly barricaded in accordance with local site needs. These needs will be determined by proximity to traffic ways, both pedestrian and vehicular, and site of the hole, trench, or obstacle. If holes are required to be left open during nonworking hours, they will be adequately decked over or barricaded and sufficiently lighted.
3. Prior to conducting any digging or boring operations, underground utility locations will be identified. The site representative and local utility authorities will be contacted to provide locations of underground utility lines and product piping. All boring, excavation, and other site work will be planned and performed with consideration for underground lines.
4. Smoking and ignition sources in the vicinity of flammable or contaminated material is prohibited.
5. Drilling, boring, movement and use of cranes and drilling rigs, erection of towers, movement of vehicles and equipment, and other activities will be planned and performed with consideration for the location, height, and relative position of aboveground utilities and fixtures, including signs, lights, canopies, buildings, and other structures and construction, and natural features such as trees, boulders, bodies of water, and terrain.
6. When working in areas where flammable vapors may be present, particular care must be exercised with tools and equipment that may be sources of ignition. All tools and equipment so provided must be properly bonded and/or grounded.
7. Approved and appropriate safety equipment, as specified in this site-specific HASP, such as eye protection, hard hats, foot protection, and respirators, must be worn in areas where required by the site-specific HASP. In addition, eye protection must be worn when handling free product, contaminated soil or water, or fill dirt.
8. Beards that interfere with respirator fit are not allowed within the site boundaries. This is necessary because all site personnel

may be called upon to use respirator protection in some situations, and beards do not allow for proper respirator fit.

9. No smoking, eating, or drinking will be allowed in the contaminated areas.
10. Tools and hands must be kept away from the face.
11. Personnel must shower at the end of the shift or as soon as possible after leaving the site.
12. Each sample must be treated and handled as though it were extremely toxic.
13. Tank pit excavations must be sampled cautiously, using a remote sampling device or securing samples from excavated soil, and the pit should be entered only as a last resort and only if it is properly shored or sloped. The pit may meet the criteria for a confined space, in which case any entry must be made in accordance with NIOSH recommended Confined Space Entry Procedures. No confined space entry except by written procedure approved by the Health and Safety Officer.
14. Persons with long hair and/or loose-fitting clothing that could become entangled in power equipment are not permitted in the work area.
15. Horseplay is prohibited in the work area.
16. Working while under the influence of intoxicants, narcotics, or controlled substances is prohibited.

5.2 Work Limitations

HOURS

Work shall be limited to daylight hours and during normal weather conditions. Extremes in temperature and weather condition (i.e., wind and lightning) will restrict working hours.

HEAT STRESS

For monitoring the body's recuperative ability toward excess heat, the following techniques will be used as a screening mechanism. Monitoring of personnel wearing protective clothing will commence when the ambient temperature is 70 degrees Fahrenheit (°F) or above. When temperatures exceed 85°F, workers will be monitored after every work period. Monitoring will include visual observations for signs of heat stress and measurement of radial pulse rate for 30 seconds at the beginning of each rest period. If the heart rate exceeds 110 beats per minute (beats/min) at the beginning of a rest period, the next work period will be shortened by 10 minutes, and the rest period stays the same. If the pulse rate is 100 beats/min at the beginning of the next rest period, the following work cycle will be shortened another 10 minutes.

Also, good hygienic standards must be maintained by frequent change of clothing and daily showering. Clothing should be permitted to dry during rest periods. If skin problems occur, consult medical personnel.

COLD STRESS

The human body "senses" cold as a result of two factors, the air temperature and the wind velocity. Cooling of the flesh increases rapidly as wind velocity goes up. Frostbite can occur at relatively mild temperatures if wind penetrates the body insulation. For example, when the air temperature is 40°F and the wind velocity is 30 miles per hour (mph), the exposed skin would perceive an equivalent still air temperature of 13°F. Table 5-1 illustrates windchill indices and the associated hazards to exposed flesh. Precautions will be taken to minimize exposed flesh, and layered clothing will be provided, as appropriate.

Table 5-1.

Windchill Index

Windspeed (mph)	Actual Thermometer Reading (°F)										
	50	40	30	20	10	0	-10	-20	-30	-40	
Calm	50	40	30	20	10	0	-10	-20	-30	-40	
5		48	37	27	16	6	-5	-15	-26	-36	-47
10		40	28	16	4	-9	-21	-33	-46	-58	-70
15		36	22	9	-5	-18	-36	-45	-58	-72	-85
20		32	18	4	-10	-25	-39	-53	-67	-82	-96
25		30	16	0	-15	-29	-44	-59	-74	-88	-104
30		28	13	-2	-18	-33	-48	-63	-79	-94	-109
35		27	11	-4	-20	-35	-49	-67	-82	-98	-113
40		26	10	-6	-21	-37	-53	-69	-85	-100	-116

Source: National Safety Council, 1982.

5.3 Accident Prevention Plan/Accident Reporting

The purpose of the Safety Plan is to prevent accidents and minimize the impact of an accident if one should occur.

All accidents must be reported to the Site Safety Officer immediately. Prompt reporting is essential to the prevention of future incidents in addition to the well-being of the affected individual or individuals. The Site Safety Officer will notify the Project Manager of any serious accidents. The Site Safety Officer or other key members of the field team will be trained in first aid and CPR. First aid will be administered to affected personnel under the direction of the Site Safety Officer. For serious accidents, the nearest ambulance service will be contacted for transport of injured personnel to the nearest medical facility (see Section 6.0). The Site Safety Officer will have established contact and liaison with medical authorities (see Section 6.0) whose personnel will be knowledgeable of the activities of the field team. Telephone numbers and addresses of ambulance and medical services will be posted on site.

A formal report of any OSHA-recordable accident will be filed with ESE. All reports must be received within 2 working days.

5.4 Work Zones and Decontamination Procedures

Work zones will be established in accordance with guidance provided in Figure 5-1. These zones may be modified to fit applicable field conditions; however, proposed modifications must be approved by the Project Manager and Site Safety Officer prior to being implemented in the field.

Personnel decontamination will be initiated on site. Disposable clothing will be removed and stored in designated containers. If additional decontamination is necessary, based on preliminary or subsequent risk assessment by the Site Safety Officer in consultation with ESE Regional Safety and Health Officer, additional decontamination procedures will be implemented. Site specific decontamination procedures will be listed in the Site-Specific Plan.

All heavy equipment will be decontaminated on site. Water in the form of steam cleaning and/or pressure washing may be used to remove any visual contamination from drilling equipment and backhoe.

5.5 Site Security and Entrance

Site security measures, including barricading, fencing, and lighting, and any special site entry procedures will be described in the Section 5 of the Site-Specific Plan.

6.0 EMERGENCY INFORMATION AND CONTINGENCY PLANS

All emergency information, including phone numbers, site resources, and routes to emergency medical care, will be maintained on site in the Site-Specific Plan by each field team.

The phone list will include the following numbers:

AMBULANCE:
FIRE DEPARTMENT:
HOSPITAL (primary):
HOSPITAL (secondary):
POISON CONTROL CENTER:
POLICE:
TOXIC WASTE AND OIL SPILL:
CLIENT CONTACT:
AGENCY CONTACT:
PROJECT MANAGER:
REGIONAL SAFETY AND HEALTH OFFICER:

The list of site resources will include fire extinguishers, first aid equipment, eyewash units, communications (telephone), emergency personal protective equipment, spill containment equipment and materials, and any other special equipment, supplies or resources.

6.1 Injury Contingency Plan

First aid equipment will be kept on site during all site activities. Additionally, one member of the field team will be trained in first aid. Emergency telephone numbers for ambulance and poison control will be maintained on site in a readily accessible location. Names, addresses, and routes to two emergency medical care providers (hospitals or emergency clinics) will be verified prior to any site activity, and will be listed in the Site-Specific Plan. Maps showing the location of the site, the emergency medical care providers, and hotels and restaurants (if any) used by the field team should be provided in each vehicle. In the event of an injury that cannot be treated on site, the injured person will be immediately transported to the medical provider either by support vehicle or ambulance on determination by the Site Safety Officer, Project Manager, and/or first aid provider.

6.2 Fire Control and Contingency Plan

No smoking will be allowed during field activities. Fire extinguishers will be available at sites for use on small fires. All samples must be treated as flammable or explosive. The Site Safety Officer will have available the telephone number of the nearest fire station and local law enforcement agencies in case of a major fire emergency.

6.3 Spill Control and Contingency Plan

In the event of a spill, the Site Safety Officer will be notified immediately. The important factors are that no personnel are overexposed to vapors, gases, or mists and that the liquid does not ignite. Waste spillage must not be allowed to contaminate any local water source. Small dikes will be erected to contain spills, if necessary, until proper disposal can be completed. Subsequent to cleanup activities, the Site Safety Officer will survey the area to ensure that no toxic or explosive vapors remain.

6.4 Off-Site Incident Contingency Plan

The Site Safety Officer will provide field team members with emergency medical care information similar to that kept on site in event of an off site emergency, such as a motor vehicle accident, food poisoning, or other injury sustained off the site.

6.5 Community Threat Contingency Plan

The potential for exposure to the surrounding community will be assessed in conjunction with the preliminary site assessment.

The Site Safety Officer will consult with a representative of the local emergency services agency (police or fire department, in accordance with local governmental procedures), and will outline procedures in the Site-Specific Plan to be followed in the event of an emergency threat to the surrounding populace. Situations requiring specified procedures include fire, explosion, accidental ingestion, large spills consisting of free product, and accumulation of potentially explosive vapors off site.

The Site-Specific Plan will identify individuals who will respond to reports of non-emergency community threats arising from site activities. This non-emergency response will include sampling of air, wells and ground water, and soil. Situations requiring specified procedures include small spills and presence of existing concentrations of potentially explosive vapors on site.

APPENDIX A
SITE-SPECIFIC
HEALTH & SAFETY
INFORMATION

ENVIRONMENTAL SCIENCE & ENGINEERING

SITE SPECIFIC INFORMATION

PROJECT NAME: Engineer's Hill, Alameda County GSA, Dublin, CA

PROJECT NUMBER: 6-93-5073

PROJECT MANAGER: Bart S. Miller

HEALTH AND SAFETY OFFICER: Lionel (Butch) Reynolds, CIH

THIS HEALTH AND SAFETY PLAN HAS BEEN REVIEWED AND APPROVED BY:

Lionel S. Reynolds
CERTIFIED INDUSTRIAL HYGIENIST

A. GENERAL PROJECT INFORMATION

SITE: Engineer's Hill

DATE PREPARED: June 17, 1993

LOCATION: Santa Rita Correctional Facility, Dublin, California

PREPARED BY: Bart S. Miller

OBJECTIVE (S): Drill four soil borings and collect one Hydropunch ground water sample at the site. Past analytical findings indicate diesel fuel impact to the soil at this location.

PROPOSED DATE(S) OF ON-SITE WORK: End of June, 1993 for a maximum of three days field work.

BRIEFING DATE(S): First day at site prior to commencement of field work.

BACKGROUND REVIEW: June 17, 1993

COMPLETE: X

PRELIMINARY:

-----PROJECT H.A.S.P. SUMMARY-----LEVEL(S) OF
PROTECTION: A__ B__ C__ D X MIXED__ MODIFIED__
OVERALL HAZARD ESTIMATE: HIGH__ MODERATE__ LOW X UNKNOWN_
ADDITIONAL DOCUMENTATION: TLV TABLE__ FULL HASP X METHODS__
OTHER__

B. SITE/MATERIAL CHARACTERISTICS

MATERIAL/WASTE TYPE(S): LIQUID X SOLID X GAS__ SLUDGE__

MATERIAL PRESENT IN: DRUMS__ TANKS__ OPEN X OTHER__

CHARACTERISTICS: IGNITABLE__ CORROSIVE__ TOXIC X REACTIVE__

RADIOACTIVE__ VOLATILE__ UNKNOWN__ OTHER_____

FACILITY TYPE: Former Correctional Facility CLOSED__ OPEN X

FACILITY SIZE: Greater than 10 acres

TOPOGRAPHY: Site located on south side of ridge. Moderate slope to south

PRINCIPAL DISPOSAL METHOD AND LOCATION(S) Stockpile soil at Engineer's Hill site on plastic and cover with plastic pending receipt of analytical results. Rinse water to be placed in 55-gallon capacity DOT-rated steel drums and left at Engineer's Hill site

C. HAZARD EVALUATION

HAZARDS

- Physical: Open trenches and pits. Movement of vehicles and heavy machinery (i.e. drill rig). Moving machinery can propel objects and potentially cause eye damage. Loud machinery may cause hearing impairment. Exposure to sunlight and possibility for heat stress.
- Chemical: Inhalation of volatile compounds associated with petroleum hydrocarbons as degraded diesel fuel. Physical contact with soil impacted with degraded diesel fuel.
- Biological: Potential exposure to allergenic pollens and/or insect bites/stings.

CORRECTIVE ACTIONS

- Physical: Use of hard hat, steel toed footwear, eye protection, and hearing protection. Abundant supply of water for drinking, sunblock for ultraviolet light protection, and particular attention will be paid in monitoring workers for heat stress.
- Chemical: Respirators with organic filter components will be available for worker useage. Potentially exposed hands and feel will be protected with rubber gloves and boots, respectively.
- Biological: Over the counter antihistimine medication and a field first aid kit will be made available.

D. WORK PLAN INSTRUCTIONS

PERSONAL PROTECTION REQUIRED:

Level of protection: A__ B__ C__ D X MIXED__ MODIFICATIONS__

For MIXED levels of protection describe areas and levels.

N/A

For MODIFICATIONS identify action levels.

N/A

ADDITIONAL PERSONAL PROTECTIVE EQUIPMENT (PPE):

- full or half-face respirator for every worker

MONITORING EQUIPMENT: PID X FID__ TOXIC GAS__ OXYGEN__

DETECTOR TUBES__ EXPLOSIMETER__ PERSONAL MONITOR__

OTHER INSTRUMENTS_____

NOTES (Equipment Calibration, Decontamination Procedures and, etc.):

- PID calibrated on a regular basis
- Reference gas for PID at site for continual calibration
- If required, equipment and personnel decontamination areas will be designated by the Project Manager at the start of the project. All tools will be cleaned adequately prior to final removal from the work zone, to prevent the transfer of contamination from the work site into clean areas. Protective clothing such as Tyvek® coveralls, latex gloves, boot covers, etc. will be made available and changed on a daily basis or as directed by the Project Manager. All disposable protective clothing will be put into plastic bags and disposed of in a proper manner.

E. EMERGENCY PROCEDURES

EMERGENCY ACTIONS:

FIRE OR EXPLOSION: Evacuate the area and call the fire department at 911 immediately. Once located at a safe distance from the fire, all burn victims will be given first aid treatment until the arrival of medical attention.

INJURY: Call for emergency medical assistance at 911 immediately. Once at a safe location all victims will be given first aid treatment until the arrival of medical attention.

WEATHER: Call for emergency medical assistance at 911 in the event of obvious heat stroke or advanced stress or hypothermic conditions.

OTHER:

CHEMICAL EXPOSURE ACTIONS: See Appendix C for Material Safety Data Sheets

EMERGENCY TELEPHONE NUMBERS

POLICE/FIRE/AMBULANCE: 911

POISON CONTROL: (800) 523-2222

ESE CONCORD OFFICE: (510) 685-4053

CHEMTREC: (800) 424-9300

UNDERGROUND SERVICE ALERT: (800) 642-2444

PROJECT CONTACTS

AGENCY: Alameda County Health Care Services Agency (510) 271-4320

SITE CONTACT: Mr. Ernie Hall, Facility Supervisor (510) 551-6674

CLIENT CONTACT: Mr. Jim de Vos, Alameda County GSA (510) 535-6248

F. EMERGENCY PRECAUTIONS

PRIMARY HOSPITAL/INFIRMARY:

Name: Valley Memorial Hospital

Address: 1111 East Stanel Blvd., Livermore, CA

Telephone Number (emergency): (510) 447-7000

Directions from site to emergency unit: Take Tassajara Road (south) to Interstate 580. Take Interstate 580 east. Exit south on First Street (Highway 84). After junction with Railroad Avenue, turn left into driveway of hospital

Remarks: see Figure A attached.



FIGURE A

APPENDIX B
CERTIFICATES
OF
INSURANCE

ACORD. CERTIFICATE OF INSURANCE

ISSUE DATE (MM/DD/YY)

PRODUCER

JOHNSON & HIGGINS
500 WEST MADISON STREET
SUITE 2100
CHICAGO, IL 60661

21560-00000 GAUWP 03/18/93
THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND
CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE
DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE
POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

INSURED

ENVIRONMENTAL SCIENCE &
ENGINEERING, INC.
ATT KAREN JENSEN
330 HAMILTON BLVD., STE. 300
PEORIA, IL 61602

- COMPANY LETTER **A** COMMERCE & INDUSTRY
- COMPANY LETTER **B** NATIONAL UNION FIRE INS. CO.
- COMPANY LETTER **C** PLANET INS. CO.
- COMPANY LETTER **D** NAT'L PROF. CASUALTY CO.
- COMPANY LETTER **E**

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS
	GENERAL LIABILITY				
A	X COMMERCIAL GENERAL LIABILITY CLAIMS MADE X OCCUR. OWNER'S & CONTRACTOR'S PROT.	GL3404530	3/16/93	3/16/94	GENERAL AGGREGATE \$ 5,000,000 PRODUCTS-COMP/OP AGG. \$ 5,000,000 PERSONAL & ADV. INJURY \$ 5,000,000 EACH OCCURRENCE \$ 5,000,000 FIRE DAMAGE (Any one fire) \$ 50,000 MED. EXPENSE (Any one person) \$ 5,000
	AUTOMOBILE LIABILITY				
B	X ANY AUTO X ALL OWNED AUTOS X SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS GARAGE LIABILITY	CA1188507	3/16/93	3/16/94	COMBINED SINGLE LIMIT \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE \$
	EXCESS LIABILITY				
B	X UMBRELLA FORM OTHER THAN UMBRELLA FORM	BE3088342	3/16/93	3/16/94	EACH OCCURRENCE \$ 10,000,000 AGGREGATE \$ 10,000,000
C	WORKER'S COMPENSATION AND EMPLOYERS' LIABILITY	NWA010257701	3/16/93	3/16/94	STATUTORY LIMITS EACH ACCIDENT \$ 500,000 DISEASE-POLICY LIMIT \$ 500,000 DISEASE-EACH EMPLOYEE \$ 500,000
	OTHER				
D	PROFESSIONAL/ POLLUTION LIABILITY	B72961	2/16/93	2/16/94	\$3,000,000 EACH CLAIM \$3,000,000 AGGREGATE

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS
FOR PROPOSAL PURPOSES ONLY.

CERTIFICATE HOLDER

PROPOSAL CERTIFICATE

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

Donald Price

©ACORD CORPORATION 1990

APPENDIX C

**MATERIAL
SAFETY DATA
SHEETS**



ENVIRONMENTAL DATA SHEET

EDS NUMBER ▶ 52,303

PAGE 1

97449 (9-87)

PRODUCT ▶ SHELL AUTO DIESEL

PRODUCT CODE ▶ 31100

SECTION I

PRODUCT/COMPOSITION

NO.	COMPONENT	CAS NUMBER	PERCENT
P	SHELL AUTO DIESEL	68334-30-5	100

SECTION II

SARA TITLE III INFORMATION

NO.	EHS RQ (LBS) (*1)	EHS TPQ (LBS) (*2)	SEC 313 (*3)	313 CATEGORY (*4)	311/312 CATEGORIES (*5)
P					H-1, H-2, P-3

FOOTNOTES

- *1 = REPORTABLE QUANTITY OF EXTREMELY HAZARDOUS SUBSTANCE, SEC.302
- *2 = THRESHOLD PLANNING QUANTITY, EXTREMELY HAZARDOUS SUBSTANCE, SEC 302
- *3 = TOXIC CHEMICAL, SEC 313
- *4 = CATEGORY AS REQUIRED BY SEC 313 (40 CFR 372.65 C), MUST BE USED ON TOXIC RELEASE INVENTORY FORM
- *5 = HAZARD CATEGORY FOR SARA SEC. 311/312 REPORTING

HEALTH	H-1 = IMMEDIATE (ACUTE) HEALTH HAZARD	H-2 = DELAYED (CHRONIC) HEALTH HAZARD
PHYSICAL	P-3 = FIRE HAZARD	P-4 = SUDDEN RELEASE OF PRESSURE HAZARD
	P-5 = REACTIVE HAZARD	

SECTION III

ENVIRONMENTAL RELEASE INFORMATION

UNDER EPA-CWA, THIS PRODUCT IS CLASSIFIED AS AN OIL UNDER SECTION 311. SPILLS INTO OR LEADING TO SURFACE WATERS THAT CAUSE A SHEEN MUST BE REPORTED TO THE NATIONAL RESPONSE CENTER, 800-424-8802.

SECTION IV

RCRA INFORMATION

UNDER EPA - RCRA (40 CFR 261.21), IF THIS PRODUCT BECOMES A WASTE MATERIAL, IT WOULD BE IGNITABLE HAZARDOUS WASTE, HAZARDOUS WASTE NUMBER D001. REFER TO LATEST EPA OR STATE REGULATIONS REGARDING PROPER DISPOSAL.

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT. HOWEVER, SHELL MAKES NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SHELL ASSUMES NO RESPONSIBILITY FOR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

DATE PREPARED: OCTOBER 15, 1987

SHELL OIL COMPANY
ENVIRONMENTAL AFFAIRS
P. O. BOX 4320
HOUSTON, TX 77210

FOR ADDITIONAL INFORMATION ON THIS ENVIRONMENTAL DATA PLEASE CALL
(713) 241-2252

FOR EMERGENCY ASSISTANCE PLEASE CALL
SHELL: (713) 473-9461
CHEMTREC: (800) 424-9300




MATERIAL SAFETY DATA SHEET

MSDS NUMBER ▶ 52,303-3

PAGE 1

97367 (4-85)

24 HOUR EMERGENCY ASSISTANCE			GENERAL MSDS ASSISTANCE			
SHELL: 713-473-9461 CHEMTREC: 800-424-9300			SHELL: 713-241-4819			
ACUTE HEALTH - + 2	FIRE 2	REACTIVITY 0	HAZARD RATING ▶			
			LEAST - 0	SLIGHT - 1	MODERATE - 2	
			HIGH - 3	EXTREME - 4		
*For acute and chronic health effects refer to the discussion in Section III						

SECTION I	NAME
PRODUCT ▶	SHELL AUTO DIESEL
CHEMICAL NAME ▶	DIESEL OIL
CHEMICAL FAMILY ▶	PETROLEUM HYDROCARBON
SHELL CODE ▶	31100

SECTION II-A		PRODUCT/INGREDIENT	
NO.	COMPOSITION	CAS NUMBER	PERCENT
P	SHELL AUTO DIESEL	68334-30-5	100

SECTION II-B				ACUTE TOXICITY DATA		
NO.	ACUTE ORAL LD50	ACUTE DERMAL LD50	ACUTE INHALATION LC50			
P	NOT AVAILABLE					

SECTION III HEALTH INFORMATION

THE HEALTH EFFECTS NOTED BELOW ARE CONSISTENT WITH REQUIREMENTS UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200).

EYE CONTACT

BASED ON ESSENTIALLY SIMILAR PRODUCT TESTING LIQUID IS PRACTICALLY NONIRRITATING TO THE EYES.

SKIN CONTACT

BASED ON ESSENTIALLY SIMILAR PRODUCT TESTING LIQUID IS PRESUMED TO BE MODERATELY IRRITATING TO THE SKIN. PROLONGED OR REPEATED LIQUID CONTACT CAN RESULT IN DEFATTING AND DRYING OF THE SKIN WHICH MAY RESULT IN SEVERE IRRITATION AND DERMATITIS. MAY CAUSE MILD SKIN SENSITIZATION. RELEASE DURING HIGH PRESSURE USAGE MAY RESULT IN INJECTION OF OIL INTO THE SKIN CAUSING LOCAL NECROSIS.

INHALATION

INHALATION OF VAPORS OR MIST MAY CAUSE MILD IRRITATION TO THE UPPER RESPIRATORY TRACT. HIGH CONCENTRATIONS MAY RESULT IN CENTRAL NERVOUS SYSTEM DEPRESSION. INHALATION OF HIGH LEVELS OF MIST MAY RESULT IN CHEMICAL PNEUMONITIS.

INGESTION

INGESTION OF PRODUCT MAY RESULT IN VOMITING; ASPIRATION (BREATHING) OF VOMITUS INTO THE LUNGS MUST BE AVOIDED AS EVEN SMALL QUANTITIES MAY RESULT IN ASPIRATION PNEUMONITIS.

SIGNS AND SYMPTOMS

IRRITATION AS NOTED ABOVE. SKIN SENSITIZATION (ALLERGY) MAY BE EVIDENCED BY RASHES, ESPECIALLY HIVES. EARLY TO MODERATE CNS (CENTRAL NERVOUS SYSTEM) DEPRESSION MAY BE EVIDENCED BY GIDDINESS.

HEADACHE, DIZZINESS AND NAUSEA; IN EXTREME CASES, UNCONSCIOUSNESS AND DEATH MAY OCCUR. LOCAL NECROSIS IS EVIDENCED BY DELAYED ONSET OF PAIN AND TISSUE DAMAGE A FEW HOURS FOLLOWING INJECTION. ASPIRATION PNEUMONITIS MAY BE EVIDENCED BY COUGHING, LABORED BREATHING AND CYANOSIS (BLUISH SKIN); IN SEVERE CASES DEATH MAY OCCUR.

AGGRAVATED MEDICAL CONDITIONS

PREEXISTING SKIN AND RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT. PREEXISTING SKIN OR LUNG ALLERGIES MAY INCREASE THE CHANCE OF DEVELOPING INCREASED ALLERGY SYMPTOMS FROM EXPOSURE TO THIS PRODUCT.

OTHER HEALTH EFFECTS

KIDNEY DAMAGE MAY RESULT FOLLOWING ASPIRATION PNEUMONITIS. THE RESULTS OF ANIMAL BIOASSAYS ON MIDDLE DISTILLATE FUELS SHOW THAT PROLONGED DERMAL CONTACT PRODUCES A WEAK TO MODERATE CARCINOGENIC ACTIVITY.

SEE SECTION VI FOR ADDITIONAL HEALTH INFORMATION.

SECTION IV OCCUPATIONAL EXPOSURE LIMITS

NO.	PEL/TWA	OSHA PEL/CEILING	TLV/TWA	ACGIH TLV/STEL	OTHER
-----	---------	---------------------	---------	-------------------	-------

P *

* NO OSHA PEL OR ACGIH TLV HAS BEEN ESTABLISHED.

SECTION V EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT

FLUSH EYES WITH WATER. IF IRRITATION OCCURS, GET MEDICAL ATTENTION.

SKIN CONTACT

REMOVE CONTAMINATED CLOTHING/SHOES AND WIPE EXCESS FROM SKIN. FLUSH SKIN WITH WATER. FOLLOW BY WASHING WITH SOAP AND WATER. IF IRRITATION OCCURS, GET MEDICAL ATTENTION. DO NOT REUSE CLOTHING UNTIL CLEANED. IF MATERIAL IS INJECTED UNDER THE SKIN, GET MEDICAL ATTENTION PROMPTLY TO PREVENT SERIOUS DAMAGE; DO NOT WAIT FOR SYMPTOMS TO DEVELOP.

INHALATION

REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GET MEDICAL ATTENTION.

INGESTION

DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.

NOTE TO PHYSICIAN

IF MORE THAN 2.0 ML PER KG HAS BEEN INGESTED AND VOMITING HAS NOT OCCURRED, EMESIS SHOULD BE INDUCED WITH SUPERVISION. KEEP VICTIM'S HEAD BELOW HIPS TO PREVENT ASPIRATION. IF SYMPTOMS SUCH AS LOSS OF GAG REFLEX, CONVULSIONS OR UNCONSCIOUSNESS OCCUR BEFORE EMESIS, GASTRIC LAVAGE USING A CUFFED ENDOTRACHEAL TUBE SHOULD BE CONSIDERED.

SECTION VI SUPPLEMENTAL HEALTH INFORMATION

REPEATED DERMAL APPLICATION OF HIGH LEVELS OF MIDDLE DISTILLATE FUELS IN EXPERIMENTAL ANIMALS HAS PRODUCED EXTREMELY SEVERE IRRITATION TO CORROSIVE ACTION ON THE SKIN. VARYING DEGREES OF LIVER AND KIDNEY DAMAGE WERE NOTED IN THESE STUDIES, INCLUDING CONGESTION, ENLARGEMENT, MOTTLING, AND MULTIFOCAL NECROSIS.

MIDDLE DISTILLATE FUELS HAVE BEEN DEMONSTRATED TO CAUSE CHROMOSOME DAMAGE IN THE IN VIVO RAT BONE MARROW CYTOGENETICS ASSAY, AND MUTAGENIC IN THE L5178Y MOUSE LYMPHOMA ASSAY. BASED ON AN INCREASED INCIDENCE OF VARIOUS TUMORS IN STUDIES WITH LABORATORY ANIMALS, THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH) REGARDS WHOLE DIESEL EXHAUST AS A POTENTIAL OCCUPATIONAL CARCINOGEN.

PROTECTIVE CLOTHING

NO SPECIAL EYE PROTECTION IS ROUTINELY NECESSARY. AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. WEAR CHEMICAL RESISTANT GLOVES AND OTHER CLOTHING AS REQUIRED TO MINIMIZE CONTACT.

ADDITIONAL PROTECTIVE MEASURES

USE EXPLOSION-PROOF VENTILATION AS REQUIRED TO CONTROL VAPOR CONCENTRATIONS.

SECTION XI ENVIRONMENTAL PROTECTION

SPILL OR LEAK PROCEDURES

CAUTION. COMBUSTIBLE. *** LARGE SPILLS *** ELIMINATE POTENTIAL SOURCES OF IGNITION. WEAR APPROPRIATE RESPIRATOR AND OTHER PROTECTIVE CLOTHING. SHUT OFF SOURCE OF LEAK ONLY IF SAFE TO DO SO. DIKE AND CONTAIN. REMOVE WITH VACUUM TRUCKS OR PUMP TO STORAGE/SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ABSORBENT SUCH AS CLAY, SAND, OR OTHER SUITABLE MATERIAL; PLACE IN NON-LEAKING CONTAINERS AND SEAL TIGHTLY FOR PROPER DISPOSAL. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE; DISPOSE OF FLUSH SOLUTION AS ABOVE. *** SMALL SPILLS *** TAKE UP WITH AN ABSORBENT MATERIAL AND PLACE IN NON-LEAKING CONTAINERS FOR PROPER DISPOSAL.

SECTION XII SPECIAL PRECAUTIONS

KEEP LIQUID AND VAPOR AWAY FROM HEAT, SPARKS AND FLAME. SURFACES THAT ARE SUFFICIENTLY HOT MAY IGNITE EVEN LIQUID PRODUCT IN THE ABSENCE OF SPARKS OR FLAME. EXTINGUISH PILOT LIGHTS, CIGARETTES AND TURN OFF OTHER SOURCES OF IGNITION PRIOR TO USE AND UNTIL ALL VAPORS ARE GONE. VAPORS MAY ACCUMULATE AND TRAVEL TO IGNITION SOURCES DISTANT FROM THE HANDLING SITE; FLASH-FIRE CAN RESULT. KEEP CONTAINERS CLOSED WHEN NOT IN USE. USE (ONLY) WITH ADEQUATE VENTILATION. CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, CAN CONTAIN EXPLOSIVE VAPORS. DO NOT CUT, DRILL, GRIND, WELD OR PERFORM SIMILAR OPERATIONS ON OR NEAR CONTAINERS. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOKING OR USING TOILET FACILITIES. LAUNDRY CONTAMINATED CLOTHING BEFORE REUSE.

SECTION XIII TRANSPORTATION REQUIREMENTS

DEPARTMENT OF TRANSPORTATION CLASSIFICATION:
COMBUSTIBLE LIQUID

D.O.T. PROPER SHIPPING NAME:
FUEL OIL, NA 1993

SECTION XIV OTHER REGULATORY CONTROLS

THIS PRODUCT IS LISTED ON THE EPA/TSCA INVENTORY OF CHEMICAL SUBSTANCES.

IN ACCORDANCE WITH SARA TITLE III, SECTION 313, THE EDS SHOULD ALWAYS BE COPIED AND SENT WITH THE MSDS.

SECTION XV SPECIAL NOTES

THIS REVISION INCORPORATES THE FINDINGS OF DIESEL EXHAUST CARCINOGENICITY INTO SECTION VI.

SECTION VII **PHYSICAL DATA**

BOILING POINT: 450 (APPROX.) (DEG F)	SPECIFIC GRAVITY: 0.8762 (H2O=1)	VAPOR PRESSURE: NOT AVAILABLE (MM HG)
MELTING POINT: NOT AVAILABLE (DEG F)	SOLUBILITY: NEGLIGIBLE (IN WATER)	VAPOR DENSITY: >1 (AIR=1)

EVAPORATION RATE (N-BUTYL ACETATE = 1): NOT AVAILABLE

APPEARANCE AND ODOR:
YELLOW LIQUID; STRONG HYDROCARBON ODOR.

SECTION VIII **FIRE AND EXPLOSION HAZARDS**

FLASH POINT AND METHOD: 130 DEG F (PMCC) MIN.	FLAMMABLE LIMITS /% VOLUME IN AIR LOWER: N/AV UPPER: N/AV
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EXTINGUISHING MEDIA

USE WATER FOG, FOAM, DRY CHEMICAL OR CO2. DO NOT USE A DIRECT STREAM OF WATER. PRODUCT WILL FLOAT AND CAN BE REIGNITED ON SURFACE OF WATER.

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS

CAUTION. COMBUSTIBLE. DO NOT ENTER CONFINED FIRE SPACE WITHOUT FULL BUNKER GEAR (HELMET WITH FACE SHIELD, BUNKER COATS, GLOVES AND RUBBER BOOTS), INCLUDING A POSITIVE PRESSURE NIOSH APPROVED SELF-CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WITH WATER. IN THE CASE OF LARGE FIRES, ALSO COOL SURROUNDING EQUIPMENT AND STRUCTURES WITH WATER.

UNUSUAL FIRE AND EXPLOSION HAZARDS

CONTAINERS EXPOSED TO INTENSE HEAT FROM FIRES SHOULD BE COOLED WITH WATER TO PREVENT VAPOR PRESSURE BUILDUP WHICH COULD RESULT IN CONTAINER RUPTURE. CONTAINER AREAS EXPOSED TO DIRECT FLAME CONTACT SHOULD BE COOLED WITH LARGE QUANTITIES OF WATER AS NEEDED TO PREVENT WEAKENING OF CONTAINER STRUCTURE.

SECTION IX **REACTIVITY**

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS AND MATERIALS TO AVOID:

AVOID HEAT, FLAME AND CONTACT WITH STRONG OXIDIZING AGENTS.

HAZARDOUS DECOMPOSITION PRODUCTS

THERMAL DECOMPOSITION PRODUCTS ARE HIGHLY DEPENDENT ON THE COMBUSTION CONDITIONS. A COMPLEX MIXTURE OF AIRBORNE SOLID, LIQUID, PARTICULATES AND GASES WILL EVOLVE WHEN THIS MATERIAL UNDERGOES PYROLYSIS OR COMBUSTION. CARBON MONOXIDE AND OTHER UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED UPON COMBUSTION.

SECTION X **EMPLOYEE PROTECTION**

RESPIRATORY PROTECTION

USE A NIOSH-APPROVED RESPIRATOR AS REQUIRED TO PREVENT OVEREXPOSURE. IN ACCORD WITH 29 CFR 1910.134, USE EITHER A FULL-FACE, ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS.

THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT. HOWEVER, SHELL MAKES NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SHELL ASSUMES NO RESPONSIBILITY FOR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

DATE PREPARED: NOVEMBER 06, 1989

BE SAFE

READ OUR PRODUCT
SAFETY INFORMATION ...AND PASS IT ON
(PRODUCT LIABILITY LAW
REQUIRES IT)

J. C. WILLET

SHELL OIL COMPANY
PRODUCT SAFETY AND COMPLIANCE
P. O. BOX 4320
HOUSTON, TX 77210

ATTACHMENT 2

ESE STANDARD OPERATING PROCEDURE NO. 1

**ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
CONCORD, CALIFORNIA OFFICE**

**STANDARD OPERATING PROCEDURE NO. 1
FOR SOIL BORINGS AND SOIL SAMPLING WITH HOLLOW-STEM AUGERS
IN UNCONSOLIDATED FORMATIONS**

Environmental Science & Engineering, Inc. (ESE) typically drills soil borings using a truck-mounted, continuous-flight, hollow-stem auger drill rig. The drill rig is owned and operated by a drilling company possessing a valid State of California C-57 license. The soil borings are conducted under the direct supervision and guidance of an experienced ESE geologist. The ESE geologist logs each borehole during drilling in accordance with the Unified Soil Classification System (USCS). Additionally, the ESE geologist observes and notes the soil color, relative density or stiffness, moisture content, odor (if obvious) and organic content (if present). The ESE geologist will record all observations on geologic boring logs.

Soil samples are collected during drilling at a minimum of five-foot intervals by driving an 18-inch long Modified California Split-spoon sampler (sampler), lined with new, thin-wall brass sleeves, through the center of and ahead of the hollow stem augers, thus collecting a relatively undisturbed soil sample core. The brass sleeves are typically 2-inches in diameter and 6-inches in length. The sampler is driven by dropping a 140-pound hammer 30-inches onto rods attached to the top of the sampler. Soil sample depth intervals and the number of hammer blows required to advance the sampler each six-inch interval are recorded by the ESE geologist on geologic boring logs. The ends of one brass sleeve are covered with Teflon sheeting, then covered with plastic end caps. The end caps are sealed to the brass sleeve using duct tape. Each sample is then labeled and placed on ice in a cooler for transport under chain of custody documentation to the designated analytical laboratory. A portion of the remaining soil in the sampler is placed in either a new Ziploc® bag or a clean Mason Jar® and set in direct sunlight to enhance the volatilization of any Volatile Organic Compounds (VOCs) present in the soil. After approximately 15-minutes that sample is screened for VOCs using a photoionization detector (PID). The PID measurements will be noted on the geologic boring logs. The PID provides qualitative data for use in selecting samples for laboratory analysis. Soil samples from the saturated zone (beneath the ground-water table) are collected as described above, are not screened with the PID, and are not submitted to the analytical laboratory. The samples from the saturated zone are used for descriptive purposes. Soil samples from the saturated zone may be retained as described above for physical analyses (grain size, permeability and porosity testing).

If the soil boring is not going to be completed as a well, then the boring is typically terminated upon penetrating the saturated soil horizon or until a predetermined interval of soil containing no evidence of contamination is penetrated. This predetermined interval is typically based upon site specific regulatory or client guidelines. The boring is then backfilled using either neat cement, neat cement and bentonite powder mixture (not exceeding 5% bentonite), bentonite pellets, or a sand and cement mixture (not exceeding a 2:1 ratio of sand to cement). However, if the boring is to be completed as a monitoring well, then the boring is continued until either a competent, low estimated-permeability, lower confining soil layer is found or 10 to 15-feet of the saturated soil horizon is penetrated, whichever occurs first. If a low estimated-permeability soil layer is found, the soil boring will be advanced approximately five-feet into that layer to evaluate its competence as a lower confining layer, prior to the termination of that boring.

All soil sampling equipment is cleaned between each sample collection event using an Alconox® detergent and tap water solution followed by a tap water rinse. Additionally, all drilling equipment and soil sampling equipment is cleaned between borings, using a high pressure steam cleaner, to prevent cross-contamination. All wash and rinse water is collected and contained onsite in Department of Transportation approved containers (typically 55-gallon drums) pending laboratory analysis and proper disposal/recycling.